Materials Engineering Branch

TIP*

No. 104 A Low Outgassing Label Material

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A potential contributing factor to the problem of controlling spacecraft contamination levels is the need to identify the flight hardware. Marking inks are most often used to stamp or stencil part numbers and other information on all types of electronic parts, subassemblies, and other hardware. MEB TIP 038 covers marking inks and recommends guidelines in using marking materials.

Another method for marking flight hardware is the use of labels. Unfortunately, most of the label materials that have been tested in our laboratories do not pass outgassing tests. However, the MEB has tested several Dynamark labels for outgassing and found them to have TML (Total Mass Loss) and CVCM (Collected Volatile Condensable Material) values well below the acceptable limits of 1.0% and 0.10% respectively.

The Decorative Products Division of the 3M Company manufactures the Dynamark labels. They are made of a flexible plastic sheeting featuring an ultraviolet sensitive coating on a 0.012-inch aluminum substrate with a pressure sensitive acrylic adhesive backing.

Information is put on artwork composed of opaque copy on a transparent carrier. Photographic negatives or positives are recommended but transfer or rub-on lettering on clear acetate or Mylar may also be used. Any method that produces "opaque on clear carriers" can be used to produce high quality labels. Exposing the photosensitive surface with ultraviolet light that passes through the transparent/opaque artwork makes the label. The label is then developed to complete the transfer.

Dynamark labels can be exposed with a number of light sources that emit ultraviolet (UV) light. Trial exposures can be made on "sensitivity guides" and time exposure tables can be used to establish optimum times. Exposure time varies from one to five minutes. Detailed process techniques are available from the Decorative Products Division of the 3M Company, St. Paul, MN.

A protective film is applied over the completed label to provide long life. The manufacturer estimates a five-year outdoor life for their 8030 label protected with 8020 protective film. Outgassing data for this combination is 0.14% TML and 0.01% CVCM.

Figure 1 is a photograph of a sample label obtained from the manufacturer. This type of label was used on the HST to mark the center of gravity of the High Speed Polarimeter instrument.

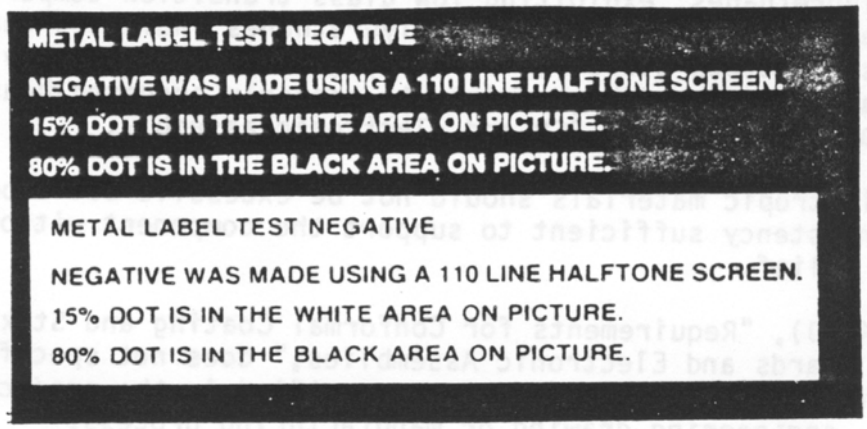

Figure 1. Photograph of a Dynamark Label.